SDI-DMX Mixer Pro

User Manual

HIGH END SYSTEMS®

BARCO

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Product Overview

The SDI-DMX Mixer Pro is a hybrid switcher with the ability to switch, mix and matrix four SDI video inputs to four video outputs directly from any DMX lighting controller. Incoming video signals can be switched and mixed to their output(s) via command signals from a DMX512 lighting desk, the RS232 port or the onboard menu system.

Features

- Operates as both a 4x4 matrix and a 'virtual' mixer whose inputs may be assigned and whose output may be routed to any combination of outputs
- Four independent SDI inputs and outputs with BNC connectors
- Patented gen-lock bus system for faster mixing and switching
- Each input signal frame-buffered and genlocked to an internal black burst signal ensuring that a video signal is always output
- Frame delay of 1 frame or less
- Individual digital video processor chips per input and output
- Multiple control methods - DMX, Serial (RS232) or from the menu
- Input verification and display
- Multi-format, auto-detecting video system (supports NTSC and PAL)
- Force video format NTSC/PAL and manual output override
- Input chasing function for stand alone usage
- Daisy chain units to expand input/output options
- Small - 1U rack mount

Specifications

Mechanical

Dimensions: 481 mm x 40 mm x 205 mm (18.9 in x 1.6 in x 8 in)

Shipping Box Dimensions: 533 mm x 152 mm x 279 mm (21 in x 6 in x 11 in)

Fixture weight: 3.1 kg (6.9 lb)

Shipping weight: 51.3 kg (9.1 lb)

Operation

Input: 4 x SDI (BNC) 525+625 line

Output: 4 x SDI (BNC) 525+625 line selectible

Format: Multi-format - 625 line (PAL) , 525 line (NTSC). *Note that all inputs must be same format.*

Control Options: DMX-512 (5-Pin XLR) using seven channels
RS232 (D-Sub)
Front Panel User Interface

Display: Power LED
DMX Present LED
Four Video Input Present LEDs
Seven-Segment Menu Display

Electrical

Power: 100-240 VAC 50/60Hz Switchable IEC Connector on PSU

DC Output: 6v

Consumption: 1- 4.5 A, 6-27w

Construction

Casing: 1U x 19" Rack Casing

Compliance: CE

NOTE: Design and specifications are subject to change without notice.

Installation

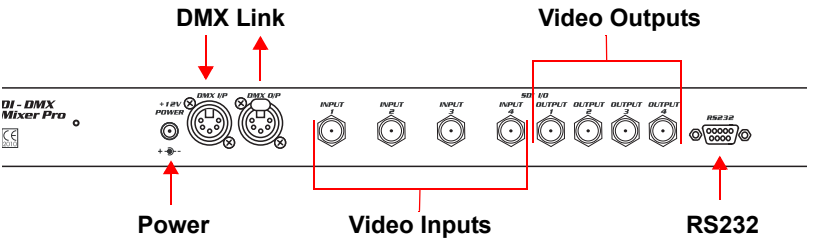
Unpacking

Carefully unpack the SDI-DMX Mixer Pro the verify that it arrived complete and without any damage. If you do find damage, you must notify both the shipping agent and your sales agent immediately.

Do not discard the shipping carton and packing materials. The carton and packing materials are specifically designed to protect the product during transport. High End Systems assumes no responsibility for products damaged during transport. Any product being returned for repair must be shipped in its original shipping carton and packing materials.

NOTE: Before sending anything to the factory, be sure to call your HES dealer/distributor for a Return Authorization (RA) number. The factory cannot accept any goods shipped without an RA number.

Hardware Installation



Connecting the Video Inputs and Outputs

- Connect the SDI sources to the unit via the four BNC connectors.
- Connect the SDI outputs to the unit via the four BNC outputs.
- Connect the power connector and power up the unit.

When an input receives a video signal, the corresponding "Video Present" LED will illuminate on the front of the unit. This lets you verify that the video source equipment is operating correctly.

NOTE: This unit is not a standards converter so all input and output devices must be of the same video standard, either 625 line - PAL or 525 line - NTSC. You can "force" a video standard for an output using menu commands, see SYSt (Set Standard) on page 9.

Connecting to Communication Interface

The SDI-DMX Mixer Pro can accept DMX Controller commands or RS232 commands.

NOTE: Only one signal type should be used at any one time. Connection and transmission of both signal types may result in erratic behaviour.

You can set a DMX Start Channel for the unit using the menu system. See *AddR (Address)* on page 6.

Connecting to the DMX 512 link

The DMX512 control is connected by the 5-pin XLR connectors on the rear of the unit. The unit features a DMX in and DMX through port for connection to other devices. Plug in the DMX cable and also the DMX Thru cable if required.

Connecting the RS232 Interface

The unit features an RS232 serial port for computer control and system integration. This is connected via the D-Type connector on the rear of the unit.

Connecting to Power

Power for the units is supplied in the form of a plug-top mains adapter or inline mains "brick". This is an auto-ranging unit and can be used with any mains voltage.

The low voltage DC connector plugs into the power connector on the rear of the unit and secures by means of a screw thread.

CAUTION! Always unscrew the connector before attempting to remove it! Failure to do so may result in damage to the connector, mains adapter or unit.

Original PSUs must be used with these units. Using a non-OEM PSU may result in damage to the unit and will void the warranty. PSUs may be ordered from your local distributor.

Powering Up the Unit

There is no ON/OFF switch on the SDI-DMX Mixer Pro. When connected to power, the unit starts and initiates the following:

- The Power light comes on and runs a self test sequence.
- The numeric display on the front panel illuminates displaying the current DMX address.
- The DMX OK LED will light when the unit is receiving external DMX-512 data.
- After 60 seconds, the unit's numeric display dims to conserve power and the unit will auto lock. To unlock the interface, press both the <+> and <-> buttons for 3 seconds.

Operation

Menu System

You can use the onboard menu system to:

- set a DMX Start Channel
- switch between the inputs
- manually assign a video standard
- set up an auto-sequence/chase function
- reset the unit.

Navigate through the menu functions by pressing the Plus **<+>** and Minus **<->** buttons to cycle through the options available on a menu level. Use the **Enter** button to store a menu option and the **Menu** button to exit a menu level.

Note: ***You have to wait 60 seconds for the menu to time out and return to the lock/output display mode***

AddR (Address)

The Address menu option lets you assign a DMX Start Channel value for the unique seven-channel range the SDI-DMX Mixer Pro unit requires on a DMX link. To set a Start Channel Address:

1. Unlock the interface by pressing the Plus (**+**) and Minus (**–**) buttons together for 3 seconds. ***Addr*** is the first option you will see.
2. Press the **Enter** button to select
3. Use the Plus and Minus buttons to scroll to the a valid DMX decimal value.
4. Use the Plus and Minus buttons to increase or decrease the DMX value to a valid start channel. Holding a button will accelerate the count increment after 2 seconds.
5. Press the **Enter** button to store the value.

OutP (Output)

The output section of the menu allows the user to assign an input to each of the four outputs for manual switching, or place them under DMX control so they may be switched from the DMX lighting console.

1. Unlock the interface by pressing the Plus (**+**) and Minus (**–**) buttons together for 3 seconds.
2. Use the Plus and Minus buttons to scroll to **OutP**
3. Press the **Enter** button to select
4. Use the **+** and **–** buttons to scroll to the Output you want to control:

   OP1- (Output 1)
   OP2- (Output 2)
   OP3- (Output 1)
   OP4- (Output 1)

5. Press the **Enter** button to select.
6. Use the **+** and **–** buttons to scroll to choose the input for an Output:

   OP1d (Output 1 controlled by DMX)
   OP11 (Output 1 takes Input 1)
   OP12 (Output 1 takes Input 2)
   OP13 (Output 1 takes Input 3)
   OP14 (Output 1 takes Input 4)

   OP2d (Output 2 controlled by DMX)
   OP21 (Output 2 takes Input 1)
   OP22 (Output 2 takes Input 2)
   OP23 (Output 2 takes Input 3)
   OP24 (Output 2 takes Input 4)

   OP3d (Output 3 controlled by DMX)
   OP31 (Output 3 takes Input 1)
   OP32 (Output 3 takes Input 2)
   OP33 (Output 3 takes Input 3)
   OP34 (Output 3 takes Input 4)

   OP4d (Output 4 controlled by DMX)
   OP41 (Output 4 takes Input 1)
   OP42 (Output 4 takes Input 2)
   OP43 (Output 4 takes Input 3)
   OP44 (Output 4 takes Input 4)

7. Press the **Enter** button to store your selection.

AUtO (Auto-chasє)

The Auto-chase function lets you jump between all the inputs currently transmitting video and switch them across the four video outputs at a rate determined by the Speed setting.

1. Unlock the interface by pressing the **+** (Plus) and **–** (Minus) buttons together for 3 seconds.
2. Use the **+** (Plus) and **–** (Minus) buttons to scroll to Off to **AUtO.**
3. Press the **Enter** button to select.
4. Use the **+** and **–** buttons to scroll to **ON** to automatically chase transmitting inputs or **OFF** to stop a chase that is currently selected.
5. Press the **Enter** button to select.
6. Press the **Enter** button to select. If you have selected **ON**, the menu will display **SPD** to select the chase speed.
7. Press the **Enter** button to select.
8. Use the **+** and **–** buttons to scroll to the chase speed you want and then press the **Enter** button to store your selection.

   SP-0 = (512 seconds)
   SP-1 = (256 seconds)
   SP-2 = (128 seconds)
   SP-3 = (64 seconds)
   SP-4 = (32 seconds)
   SP-5 = (16 seconds)
   SP-6 = (8 seconds)
   SP-7 = (4 seconds)
   SP-8 = (2 seconds)
   SP-9 = (1 seconds)

SYSt (Set Standard)

1. Unlock the interface by pressing the **+** (Plus) and **–** (Minus) buttons together for 3 seconds.
2. Use the **+** (Plus) and **–** (Minus) buttons to scroll to Off to **SYSt**.
3. Press the **Enter** button to select.
4. Use the **+** and **–** buttons to scroll to **PAL** to force 625 line PAL or **ntSc** to force 525 line NTSC format.
5. Press the **Enter** button to store your selection.

RSET (Reset)

1. Unlock the interface by pressing the **+** (Plus) and **–** (Minus) buttons together for 3 seconds.
2. Use the **+** (Plus) and **–** (Minus) buttons to scroll to Off to **RSET**.
3. Press the **Enter** button to select.
4. Use the **+** and **–** buttons to scroll to **YES**
5. Press the **Enter** button to store your selection. The unit will be reset to:

   DMX address = 1
   Output = DMX control
   Video Standard does not change

Cycling Power

When you restart the unit, it starts up in the following state:

- the DMX address remains as the last selected value
- all output(s) default to DMX control
- all auto chase functions switch to **OFF**

DMX Control

The SDI-DMX Mixer Pro utilizes seven consecutive channels on a DMX link beginning with the start channel that you set using the unit's menu system, (see *AddR (Address)* on page 6.

DMX Protocol

Channel	Parameter	Description	Value (dec.)	Value (hex)
1	Output 1	Route video black to Output 1	0-40	00-28
		Route video input 1 to Output 1	41-80	29-50
		Route video input 2 to Output 1	81-120	51-78
		Route video input 3 to Output 1	121-160	79-A0
		Route video input 4 to Output 1	161-200	A1-C8
		Route Mixed Video to Output 1	201-255	C9-FF
2	Output 2	Route video black to Output 2	0-40	00-28
		Route video input 1 to Output 2	41-80	29-50
		Route video input 2 to Output 2	81-120	51-78
		Route video input 3 to Output 2	121-160	79-A0
		Route video input 4 to Output 2	161-200	A1-C8
		Route Mixed Video to Output 2	201-255	C9-FF
3	Output 3	Route video black to output 3	0-40	00-28
		Route video input 1 to Output 3	41-80	29-50
		Route video input 2 to Output 3	81-120	51-78
		Route video input 3 to Output 3	121-160	79-A0
		Route video input 4 to Output 3	161-200	A1-C8
		Route Mixed Video to Output 3	201-255	C9-FF
4	Output 4	Route video blacrce A to output 4	0-40	00-28
		Route video input 1 to Output 4	41-80	29-50
		Route video input 2 to Output 4	81-120	51-78
		Route video input 3 to Output 4	121-160	79-A0
		Route video input 4 to Output 4	161-200	A1-C8
		Route Mixed Video to Output 4	201-255	C9-FF
5	Mixer Source A	Crossfade video black to Mixer Souce A	0-50	00-32
		Crossfade video input 1 to Mixer Source A	51-100	33-64
		Crossfade video input 2 to Mixer Source A	101-150	65-96
		Crossfade video input 3 to Mixer Source A	151-200	97-C8
		Crossfade video input 4 to Mixer Source A	201-255	C9-FF

Channel	Parameter	Description	Value (dec.)	Value (hex)
6	Mixer Source B	Crossfade video black to Mixer Souce B	0-50	00-32
		Crossfade video input 1 to Mixer Source B	51-100	33-64
		Crossfade video input 2 to Mixer Source B	101-150	65-96
		Crossfade video input 3 to Mixer Source B	151-200	97-C8
		Crossfade video input 4 to Mixer Source B	201-255	C9-FF
7	Crossfade	100% Source A	0	00
		Variable from 99% Source A to 99%	1-254	01-FE
		100% Source B	255	FF

Serial Commands

The serial interface is intended to only be used when there is no DMX input connected. If serial is used at the same time as DMX, the results will be unpredictable.

RS232 Interface Settings

Buad: 19200
Databits:8
StopBits:1
Parity: none

When communicating with the unit using RS232, remember the following:

The unit only receives data, it does not transmit.

The protocol is entirely ASCII based for ease of use or programming. You can even type the commands into hyperterminal if required.

Each command is preceded by one of two unique synchronization characters, as detailed below, followed by the numeric data and terminated by a carriage return character. The command will not be executed until the carriage return is received.

The protocol uses data slots in a similar way to the existing DMX. Each control (slot) has an 8-bit value that is subdivided into sections, each of which represents a different value. e.g. 0-50 = 1, 51-100 = 2 etc.

The hexidecimal value in a serial command will correspond to a decimal value in the protocol.

All commands carry an address that is the same one set for the DMX via the front panel interface. This allows multiple DMX units to be daisy-chained together from a single RS232 source. So, the command's address value (Start channel) must be in the range [DMX base address] to [DMX base address plus 7] to qualify for execution.

NOTE: Valid Start Channels and can range from 1 to 505 as long as they are followed by seven unused channels on the link.

Commands Structure

All data values must be hexadecimal characters with leading zeros for value 0 to F hex. Each command comprises the following sub-elements:

1. Synch character (one character)
2. Address (3 hexadecimal characters)
3. One or more command data values comprising pairs of hexadecimal characters (each pair makes 1 8-bit value)
4. termination character (carriage return single character)

Two commands are available as indicated by the sync character. The # (hash) sync character is used for a single slot transmission. The : (colon) sync character is used for a multi-slot, transmitting all 7 slots together.

Note: ***The carriage return character is represented in the following examples as <cr>. This should be replaced by a carriage return (ascii 0D hex) character when transmitting.***

Single-slot Command

The single-slot command sets a DMX value for a single channel on the DMX link. This command comprises a total of 7 ascii characters. In the following command, a value of 31 (1F hex) is sent to address 12 (00C hex).

Sync	DMX Channel			Channel Value		Term
#	0	0	C	1	F	<CR>

So, if the unit's Start Channel address is 10, this would set Output 3 to video black.

Multi-slot Command

This command comprises a total of 19 ASCII characters, and transmits values to all seven DMX Channel Values at once. The following command, assigns values for all seven DMX channel values for the unit's channel range beginning at channel 500 (1F4).

Sync	DMX Start Channel			Output 1		Output 2		Output 3		Output 4		Mixer Source A		Mixer Source B		Cross Fade		Term
:	1	F	4	1	0	1	8	2	0	3	F	6	6	C	0	D	2	<CR>

Decimal to Hex Conversion

DMX Address channel will display in Decimal in the unit, but need to entered into serial strings in Hex.

DEC	HEX	DEC	HEX	DEC	HEX	DEC	HEX	DEC	HEX	DEC	HEX	DEC	HEX	DEC	HEX
0	00	32	20	64	40	96	60	128	80	160	A0	192	C0	224	E0
1	01	33	21	65	41	97	61	129	81	161	A1	193	C1	225	E1
2	02	34	22	66	42	98	62	130	82	162	A2	194	C2	226	E2
3	03	35	23	67	43	99	63	131	83	163	A3	195	C3	227	E3
4	04	36	24	68	44	100	64	132	84	164	A4	196	C4	228	E4
5	05	37	25	69	45	101	65	133	85	165	A5	197	C5	229	E5
6	06	38	26	70	46	102	66	134	86	166	A6	198	C6	230	E6
7	07	39	27	71	47	103	67	135	87	167	A7	199	C7	231	E7
8	08	40	28	72	48	104	68	136	88	168	A8	200	C8	232	E8
9	09	41	29	73	49	105	69	137	89	169	A9	201	C9	233	E9
10	0A	42	2A	74	4A	106	6A	138	8A	170	AA	202	CA	234	EA
11	0B	43	2B	75	4B	107	6B	139	8B	171	AB	203	CB	235	EB
12	0C	44	2C	76	4C	108	6C	140	8C	172	AC	204	CC	236	EC
13	0D	45	2D	77	4D	109	6D	141	8D	173	AD	205	CD	237	ED
14	0E	46	2E	78	4E	110	6E	142	8E	174	AE	206	CE	238	EE
15	0F	47	2F	79	4F	111	6F	143	8F	175	AF	207	CF	239	EF
16	10	48	30	80	50	112	70	144	90	176	B0	208	D0	240	F0
17	11	49	31	81	51	113	71	145	91	177	B1	209	D1	241	F1
18	12	50	32	82	52	114	72	146	92	178	B2	210	D2	242	F2
19	13	51	33	83	53	115	73	147	93	179	B3	211	D3	243	F3
20	14	52	34	84	54	116	74	148	94	180	B4	212	D4	244	F4
21	15	53	35	85	55	117	75	149	95	181	B5	213	D5	245	F5
22	16	54	36	86	56	118	76	150	96	182	B6	214	D6	246	F6
23	17	55	37	87	57	119	77	151	97	183	B7	215	D7	247	F7
24	18	56	38	88	58	120	78	152	98	184	B8	216	D8	248	F8
25	19	57	39	89	59	121	79	153	99	185	B9	217	D9	249	F9
26	1A	58	3A	90	5A	122	7A	154	9A	186	BA	218	DA	250	FA
27	1B	59	3B	91	5B	123	7B	155	9B	187	BB	219	DB	251	FB
28	1C	60	3C	92	5C	124	7C	156	9C	188	BC	220	DC	252	FC
29	1D	61	3D	93	5D	125	7D	157	9D	189	BD	221	DD	253	FD
30	1E	62	3E	94	5E	126	7E	158	9E	190	BE	222	DE	254	FE
31	1F	63	3F	95	5F	127	7F	159	9F	191	BF	223	DF	255	FF

Decimal to Hex Conversion, cont.

DEC	HEX	DEC	HEX	DEC	HEX	DEC	HEX	DEC	HEX	DEC	HEX	DEC	HEX	DEC	HEX
256	100	288	20	320	40	352	60	384	80	416	A0	448	C0	480	E0
257	101	289	21	321	41	353	61	385	81	417	A1	449	C1	481	E1
258	102	290	22	322	42	354	62	386	82	418	A2	450	C2	482	E2
259	103	291	23	323	43	355	63	387	83	419	A3	451	C3	483	E3
260	104	292	24	324	44	356	64	388	84	420	A4	452	C4	484	E4
261	105	293	25	325	45	357	65	389	85	421	A5	453	C5	485	E5
262	06	294	26	326	46	358	66	390	86	422	A6	454	C6	486	E6
263	07	295	27	327	47	359	67	391	87	423	A7	455	C7	487	E7
264	08	296	28	328	48	360	68	392	88	424	A8	456	C8	488	E8
265	09	297	29	329	49	361	69	393	89	425	A9	457	C9	489	E9
266	0A	298	2A	330	4A	362	6A	394	8A	426	AA	458	CA	490	EA
267	0B	299	2B	331	4B	363	6B	395	8B	427	AB	459	CB	491	EB
268	0C	300	2C	332	4C	364	6C	396	8C	428	AC	460	CC	492	EC
269	0D	301	2D	333	4D	365	6D	397	8D	429	AD	461	CD	493	ED
270	0E	302	2E	334	4E	366	6E	398	8E	430	AE	462	CE	494	EE
271	0F	303	2F	335	4F	367	6F	399	8F	431	AF	463	CF	495	EF
272	10	304	30	336	50	368	70	400	90	432	B0	464	D0	496	F0
273	11	305	31	337	51	369	71	401	91	433	B1	465	D1	497	F1
274	12	306	32	338	52	370	72	402	92	434	B2	466	D2	498	F2
275	13	307	33	339	53	371	73	403	93	435	B3	467	D3	499	F3
276	14	308	34	340	54	372	74	404	94	436	B4	468	D4	500	F4
277	15	309	35	341	55	373	75	405	95	437	B5	469	D5	501	F5
278	16	310	36	342	56	374	76	406	96	438	B6	470	D6	502	F6
279	17	311	37	343	57	375	77	407	97	439	B7	471	D7	503	F7
280	18	312	38	344	58	376	78	408	98	440	B8	472	D8	504	F8
281	19	313	39	345	59	377	79	409	99	441	B9	473	D9	505	F9
282	1A	314	3A	346	5A	378	7A	410	9A	442	BA	474	DA	506	FA
283	1B	315	3B	347	5B	379	7B	411	9B	443	BB	475	DB	507	FB
284	1C	316	3C	348	5C	380	7C	412	9C	444	BC	476	DC	508	FC
285	1D	317	3D	349	5D	381	7D	413	9D	445	BD	477	DD	509	FD
286	1E	318	3E	350	5E	382	7E	414	9E	446	BE	478	DE	510	FE
287	1F	319	3F	351	5F	383	7F	415	9F	447	BF	479	DF	511	1FF
														512	200